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diiodopentane, 1,2,2,3,3,4,4,5,5,6,6-dodecafluoro-1,6-diiodohexane, 1,1,2,2,3,3-hexafluoro-1,3-diiodopropane, 1-iodoheptadecafluorooctane, iodoheptafluorocyclobutane, 1-iodopentadecafluoroheptane, n-iodobis-(trifluoromethyl)amine, 1,1,2,2,3,3,4,4,4-nonafluoro-1-iodobutane, 1,1,2,2,3,3,4,4-octafluoro-1, 4-diiodobutane, 1,1,2,2-tetrafluoro-1, 2-diiodoethane and trifluoromethyl-1,1,2,2-tetrafluoro-2-iodoethyl ether, and the additive being selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers.

REMARKS

An Official Action issued in this application May 12, 1995. The Official Action was incomplete in that a copy of the cited Defense Technical Information Center *Technical Report* was not enclosed. The undersigned advised the Examiner by telephone as to the incompleteness of the Official Action, and the Examiner indicated that the Official Action would be remailed with a copy of the reference which had been omitted and the period for responding to the Official Action would be restarted. The Official Action dated October 10, 1995 was subsequently issued, including a copy of the Defense Technical Information Center Technical Report and restarting the period for responding to the Official Action. The present amendment is therefore timely submitted within the three month period for response set forth in the Official Action dated May 12, 1995, as modified in the Official Action dated October 10, 1995.

The present amendment is submitted under 37 C.F.R. §1.129(a). The present application is a Rule 60 Divisional application and claims priority of application Serial No. 08/027,227 filed March 5, 1993, whereby the present application had an effective filing date of more than two years as of June 8, 1995. The \$375.00 (small entity) fee required under 37 C.F.R. §1.17(r) and §1.129(a) is enclosed by check. It is therefore submitted that the present amendment should be entered and considered in its entirety.

Initially, applicants note that the Official Actions were directed to claims 157-179. However, at the time of the issuance of the Official Actions, only claims 157-177 were pending in this application. Applicants therefore respond to the Official Action in terms of the comments therein being with regard to claims 157-177.

By the present amendment, claims 157, 169, 170 and 177 have been amended to clarify that the fire-extinguishing agent is discharged from the discharge apparatus into contact with a combustible or flammable material in accordance with the teachings of specification, for example at page 12, lines 20-22, in order to suppress or prevent combustion or burning of the material. Claims 157 and 169 have also been amended to clarify that the azeotropic or near azeotropic blends consist essentially of the recited fluoroiodocarbon and additive, thereby excluding components which would destroy the azeotropic or near azeotropic nature of the blends, and to more specifically define the additive as being selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers in accordance with claim 159. Claims 158 and 171 have been amended to correct several matters of form.

Claims 178-182 have been added. Claims 178, 179 and 181 more specifically define the fluoroiodocarbon in accordance with the teachings of the specification at pages 12 and 20. Claims 180 and 182 are directed to the fire extinguishing agents employed in the methods of claims 170 and 177, respectively. Since these changes do not involve any introduction of new matter, entry is believed to be order and is respectfully requested.

In the Official Actions, claims 157-169 were rejected under 35 U.S.C. §112, first paragraph, on the basis that the disclosure is enabling only for claims limited to relative portions of all the required components in either functional or numerical terms. The Examiner also stated that the claims are unduly broad and that they are generic to a plurality of patentable distinct species and an infinite number of non-disclosed and non-contemplated substituents and it would require undue experimentation to determine which combinations of these mixtures would produce azeotropic or near azeotropic blends. The Examiner suggested reciting either the boiling point of the mixture at a specified pressure or the vapor pressure at a specified temperature to define the azeotropic blends or near-azeotropic blends and limiting the fluoroiodocarbon and additive to species having sufficient teaching and suggestion in the specification to enable azeotropic mixtures.

However, as will be set forth in detail below, it is submitted that claims 157, 158 and 160-169 as presently amended are fully enabled by the present specification in accordance with the

requirements of 35 U.S.C. §112, first paragraph. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

More specifically, claims 157 and 169 are directed to methods of using a fire-extinguishing agent which consists essentially of an azeotropic or near azeotropic blend of a fluoroiodocarbon and at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers. Claim 169 further defines the fluoroiodocarbon as being selected from a specified group. Since the additive has been more specifically defined in both of claims 157 and 169, applicants submit that the claims are not directed to the use of an infinite number of non-disclosed and non-contemplated substituents, but rather are directed to finite number of well defined compositions, particularly in view of the fact that the compositions consist essentially of the recited fluoroiodocarbon and defined additive, and therefore exclude components which would destroy the azeotropic or near azeotropic nature of the blends.

The Examiner is correct in noting that azeotropic compositions are unique in that the boiling point or vapor pressure of an azeotrope is either higher or lower than the same property of its respective components. However, applicants respectfully decline to define the fire-extinguishing agent employed in the methods of claims 157 and 169 by either the vapor pressure or boiling point of each individual blend, since it is not necessary under 35 U.S.C. to define a composition by its properties and since the Examiner has not established that such is necessary in order to enable the present methods in accordance with the requirements of 35 U.S.C. §112, first paragraph.

It is therefore submitted that the methods defined by claims 157, 158 and 160-169 are fully enabled by the specification, in accordance with the requirements of 35 U.S.C. §112, first paragraph, whereby this rejection has been overcome. Reconsideration is respectfully requested.

Claims 157-177 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite. The Examiner stated that the claims relating to azeotropic composition using the term "comprising" were indefinite because the term leaves the claims open for the inclusion of unspecified ingredients and one skilled in the art cannot predict whether compositions containing

additional components will be azeotropic. The Examiner further asserted that the claims relating to azeotropic compositions are indefinite in failing to recite either the boiling point of the mixture at a specified pressure or the vapor pressure at a specified temperature. Finally, the Examiner asserted that all of the claims are indefinite in not expressly stating that the fire-extinguishing is being discharged onto or into a fire.

However, as set forth below, it is submitted that claims 157, 158 and 160-177, as presently amended, are definite. Accordingly, this rejection is traversed and reconsideration is respectfully requested.

As noted above, claims 157 and 169 have been amended to recite that the fire-extinguishing agent employed in the claimed methods consists essentially of an azeotropic or near azeotropic blend of the fluoroiodocarbon and the additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers, thereby preventing the inclusion in the fire-extinguishing agent of components which would destroy the azeotropic or near azeotropic nature of the blend compositions. Additionally, claims 157, 169, 170 and 177 have all been amended to more clearly recite that a fire-extinguishing amount of the fire-extinguishing agent is discharged from the discharge apparatus into contact with a combustible or flammable material. Applicants respectfully decline however to amend the claims to recite a specified boiling point or vapor pressure of the azeotropic blends on the basis that such a recitation is not necessary in order to particularly point out and distinctly claim the subject matter of the invention. That is, applicants submit that the fire-extinguishing agents employed in the methods of claims 157 and 169 are sufficiently defined by their composition and the requirement that the fire-extinguishing is azeotropic or near azeotropic since this property functionally defines the proportions of the compositions components. The Examiner has not indicated any basis for asserting that a particular property of a composition must be recited in order to definitely claim the composition or, more specifically, that the vapor pressure or boiling point of an azeotropic or near-azeotropic blend must be recited in order to definitely claim such a blend composition.

It is therefore submitted that the claims as amended are definite in accordance with the requirements of 35 U.S.C. §112, second paragraph, whereby this rejection has been overcome. Reconsideration is respectfully requested.

Claims 157-177 were rejected 35 U.S.C. §102(b) as anticipated by or, in the alternative, under 35 U.S.C. §103 as obvious over the Defense Technical Information Center *Technical Report*. The Examiner stated that the *Technical Report* teaches fluoroiodoalkanes such as CF₃I, CF₂ICF₂I and CF₃CF₂I as fire-extinguishing agents and fire-suppression agents in Tables I, II and VII. The Examiner further asserted that at page 39-43 and 62, the *Technical Report* suggests binary mixtures of halogenated carbons and halogenated hydrocarbons including binary mixtures where fluoroiodoalkane is one of the components, including in Table VII on page 62 a binary mixture of trifluoroiodomethane and bromoethane. The Examiner asserted that although the reference does not specifically recite azeotropic blends or near azeotropic blends, the fact that the reference speaks of binary mixtures having a boiling point and not a boiling range implies that azeotropic or near azeotropic blends are employed.

Alternatively, the Examiner asserted that the *Technical Report* directly teaches the claimed specifics of fluoroiodocarbons, perfluorocarbons, hydrofluorocarbons and fluoroethers as individually useful as fire-extinguishing agents and the *Technical Report* teaches and suggests employing binary mixtures of halogenated and halogenated hydrocarbons, it is not patentable to employ two or more materials in combination for the same purpose for which they are taught to be individually useful.

However, as will be set forth in detail below, applicants submit that the methods defined by claims 157, 158 and 160-77 are neither anticipated by nor rendered obvious over the *Technical Report*. Accordingly, these rejections are traversed and reconsideration is respectfully requested.

Claims 157, 158 and 160-177 are directed to methods of using a fire-extinguishing agent. The methods comprise providing a fire-extinguishing agent in a discharge apparatus and discharging a fire-extinguishing amount of the agent from the discharge apparatus into contact with a combustible or flammable material. In accordance with claims 157 and 169, the fire-extinguishing agent consists essentially of an azeotropic or near azeotropic blend of fluoroiodocarbon and at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers. Claim 169 further requires that the fluoroiodocarbon is selected from a specified group of compounds. According to claims 170 and

177, the fire-extinguishing agent comprises a blend of a fluoriodocarbon and at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers, with claim 177 further reciting a specific group of compounds from which the fluoriodocarbon is selected.

As set forth in the present specification, for example at page 17, lines 15-32, the methods of the present invention are advantageous in that they employ highly effective, non-ozone-depleting fire extinguishing agents which have low toxicity and, owing to the relatively low cost of the additives, may be provided inexpensively. The methods of claims 157 and 169 are further advantageous in the use of azeotropic and near-azeotropic blends in that the handling of the fire-extinguishing agent is simplified and the blends do not fractionate into separate components over time.

The Defense Technical Information Center *Technical Report* describes a study, research and investigation for the development of a fire-extinguishing agent with fire-fighting characteristics equal to or superior to methyl bromide. Various halogenated compounds were evaluated, including CF_3I , $\text{CF}_2\text{ICF}_2\text{I}$ and $\text{CF}_3\text{CF}_2\text{I}$. At pages 39-43 and 62, the *Technical Report* discusses binary mixtures of halogenated carbon and/or halogenated hydrocarbons. Specifically, at page 62, the *Technical Report* discloses various mixtures including mixtures of CH_3I (methyl iodide) and $\text{C}_2\text{H}_5\text{Br}$. However, contrary to the Examiner's assertions, applicants find no teaching in the *Technical Report* relating to binary mixtures of a fluoriodocarbon and another component, and particularly applicants find no teaching in the *Technical Report* relating blends of a fluoriodocarbon and an additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers.

Anticipation under 35 U.S.C. §102 requires the disclosure in a single prior art reference of each element of the claim under consideration, *Alco Standard Corp. v. TVA*, 1 U.S.P.Q.2d 1337 (Fed. Cir. 1986). In view of the failure of the *Technical Report* to disclose a mixture of a fluoriodocarbon and at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers, particularly for use as a fire-extinguishing agent, the *Technical Report* fails to disclose each element of the claims under

consideration and therefore fails to anticipate the presently claimed methods under 35 U.S.C. §102.

Moreover, the *Technical Report* fails to render obvious the presently claimed methods which employ a fire-extinguishing agent consisting essentially of an azeotropic or near azeotropic blend of a fluoriodocarbon and at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers as recited in claims 157 and 169, or the presently claimed methods employing a fire-extinguishing agent comprising a blend of a fluoriodocarbon and at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers as recited in claims 170 and 177. More particularly, applicants submit that the teachings in the *Technical Report* relating to binary mixtures of components for use as fire-extinguishing agents are limited to the specific compositions employed therein and do not suggest to one of ordinary skill in the art that all blends of all compounds discussed therein are advantageous for use as fire-extinguishing agents. In this regard, the Examiner's attention is directed to the Abstract of the *Technical Report*, particularly the paragraph bridging pages 2 and 3 of the *Technical Report*, wherein it is stated that while in certain instances the use of a mixture of halogen-containing compounds is advantageous, the actual effectiveness appeared to be characteristic of the particular mixture used, hence no generalizations could be made regarding choice of constituents in the mixtures. Additionally, the specific results set forth in Table VII at page 62 indicate that while some of the mixtures provided improved effects, some of the mixtures provided inferior fire-extinguishing properties. Thus, the *Technical Report* provides no suggestion to one of ordinary skill in the art relating to improvements which would be provided by the use of fire-extinguishing agents employed in the presently claimed methods.

At best, in view of the lengthy disclosure of the *Technical Report*, one skilled in the art might find it obvious to try various combinations of the numerous compounds disclosed therein. However, "obvious to try" is not the standard for negating patentability under 35 U.S.C. §103, *In re Geiger*, 2 U.S.P.Q.2d 1276 (Fed. Cir. 1987); *In re O'Farrell*, 7 U.S.P.Q.2d 1673 (Fed. Cir. 1988). Particularly, the *Technical Report* provides no specific suggestion that blends of a fluoriodocarbon, particularly with at least one additive selected from the group consisting of

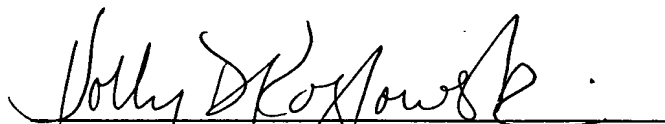
hydrofluorocarbons, perfluorocarbons and fluoroethers as presently claimed, are suitable for use as fire-extinguishing agents in methods as presently claimed.

The Examiner asserts that to employ two or more materials in combination for the same purpose that they are taught to be individually useful is not patentable, citing *In re Kerkoven*, 205 U.S.P.Q. 1069 (C.C.P.A. 1980). Applicants submit however that the Examiner's proposition is not valid in the present application wherein the *Technical Report* specifically states that no generalizations could be made regarding choice of constituents in a mixture and that in only certain instances the use of a mixture of halogen-containing compounds is advantageous. Thus, the cited prior art specifically teaches that the use of mixtures is not a predictable art in the fire-extinguishing field. The teachings in the *Technical Report* relating to the individual use of various compounds does not therefore render obvious the presently claimed methods employing blends of a fluoroiodocarbon and at least one additive selected from the group consisting of hydrofluorocarbons, perfluorocarbons and fluoroethers.

It is therefore submitted that the methods defined by claims 157, 158 and 160-177 are neither anticipated by nor rendered obvious over the *Technical Report*, whereby the rejections under 35 U.S.C. §102 and §103 have been overcome. Reconsideration is respectfully requested.

It is believed that the above represents a complete response to the Examiner's rejections under 35 U.S.C. §102, §103 and §112, first and second paragraphs, and places the present application in condition for allowance. Reconsideration and an early allowance are requested.

Respectfully requested,



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